

CAPACITORS

FACILITY ASSESSMENT AND QUALITY

Capacitors manufactured to the Military performance specifications can be purchased to Established Reliability (ER) levels, identified by a product level designator as shown in [Table 1](#). The statistical confidence levels are established at a 60% with a 10% consumer risk factor. The failure rate and statistical confidence level of capacitors purchased to commercial standards will vary. Quality assurance requirements are dependent

on the quality level of the capacitor. Capacitors conforming to the ER requirements of Military performance specifications are required to undergo Group A, B, and C testing on a periodic basis. Conformance tests for the MIL-PRF capacitor standards are given in [Table 2](#) for Group A Inspection test requirements.

Table 1. Failure Rate Designators for Military Capacitor Styles

Quality Level Designator	Failure Rate in % per 1000 hrs.
C	Non-ER
M	1.0
P	0.1
R	0.01
S	0.001

Table 2. Sample of A Group Inspection-Test Requirements for Capacitors

Inspection-Test	Military Performance Specification, MIL-PRF-					
	39014F	55681E	49467A	55514D	39001C	55365D
Mechanical Examination			X	X	X	X
Thermal Shock	X		X			
Visual Exam –Material	X	X	X		X	X
Visual Exam – Marking	X	X	X	X	X	X
Visual Exam –Workmanship	X	X	X		X	X
Solderability	X	X	X	X	X	X
Surge Voltage						X
Voltage Aging						X
Stability						X
Radiographic Inspection	S level		S level			
Voltage Conditioning	X		X			
DPA						
Short Term Overload						
DC Resistance (ESR)		X		X		
Dielectric Withstanding Voltage				X	X	
Voltage Conditioning		X				
High Voltage Stabilization					X	
Insulation Resistance				X	X	
Burn-In				X		
Dissipation Factor				X	X	

[Table 3](#) shows the conformance tests for Group B tests, and [Table 4](#) shows the conformance tests for Group C. As the tables show, tests are not the same across all capacitor styles, and some capacitor specifications no longer contain Group B or C tests.

Table 3. Sample of Group B Inspection-Test Requirements for Capacitors

Inspection-Test	Military Performance Requirements					
	39014F	55681E	49467A	55514D	39001C	55365D
Visual Exam						
Mechanical Exam						
Resistance to Solvents	X		X	X		
Life Testing	X		X	X		
Marking Legibility	Laser		Laser			
Thermal Strength	X			X		
Mechanical Shock	X			X		
Vibration	X			X		
Corrosion (salt spray)	X					
Moisture Resistance	X		X	X		
Low Temp Storage			X			
Voltage Temp Limits	X		X			
Low Temp Conditioning				X		

Table 4. Sample of Group C Inspection-Test Requirements for Capacitors

Inspection-Test	Military Performance Requirements, MIL-PRF-					
	39014F	55681E	49467A	55514D	39001C	55365D
Moisture Resistance		X			X	X
Humidity		X				
Temperature Resistance						
Temperature Coefficient and Cap Drift		X			X	
Dielectric Withstanding Voltage						
Insulation Resistance						
Series Resistance		X				
Short Time Overload						
Vibration					X	
Mechanical Shock					X	
Thermal Shock					X	X
Low Temp Storage						
Life Testing		X			X	X
Resistance to Solvents						X
Series Resonance		X				